

What is claimed is:

1. A seatbelt apparatus for a vehicle, comprising:

a webbing for restraining a passenger on a seat;

a retractor for winding and rewinding the webbing;

5 a first pretensioner that allows the retractor to wind the webbing  
thereinto or rewind the webbing therefrom;

a second pretensioner that applies a tension to the webbing in an  
emergency for the vehicle, thereby restraining the passenger through the  
webbing;

10 a deceleration detecting sensor for detecting a decelerating state of  
the vehicle; and

a controller for controlling the operations of the first pretensioner  
and the second pretensioner corresponding to a detected value from the  
deceleration detecting sensor,

15 wherein the controller includes a correcting unit for correcting the  
detected value of the deceleration detecting sensor in anticipation of the  
future so as to advance a timing of the first pretensioner to wind the  
webbing.

20 2. The seatbelt apparatus for the vehicle of claim 1, wherein the  
correcting unit corrects the detected value of the deceleration detecting  
sensor so that the detected value becomes larger than an actual deceleration  
of the vehicle or a value in correlation with the actual deceleration.

25 3. The seatbelt apparatus for the vehicle of claim 2, wherein the  
correcting unit corrects the detected value of the deceleration detecting

sensor by an expression of:

$$X^- = X + X' \times \Delta t$$

where X represents the detected value of the deceleration detecting sensor, X' a differential value of the detected value X, X<sup>-</sup> a corrected value of deceleration and  $\Delta t$  represents a time for anticipation.

4. The seatbelt apparatus for the vehicle of claim 1, wherein the deceleration detecting sensor comprises a sensor for detecting a driver's stepping stroke of a brake pedal of the vehicle.

5. The seatbelt apparatus for the vehicle of claim 1, wherein the deceleration detecting sensor comprises a sensor for detecting a deceleration of the vehicle.

6. The seatbelt apparatus for the vehicle of claim 1, wherein the deceleration detecting sensor comprises a sensor for detecting a driver's stepping force applied to a brake pedal of the vehicle.

7. The seatbelt apparatus for the vehicle of claim 3, wherein the member  $\Delta t$  is a time period less than 0.1 seconds.

8. The seatbelt apparatus for the vehicle of claim 3, wherein the member  $\Delta t$  is a fixed value.

9. The seatbelt apparatus for the vehicle of claim 3, wherein the member  $\Delta t$  is a parameter that is changeable corresponding to at least any one of a

stepping amount to a brake pedal, vehicle speed, vehicle weight, traveling place, weather, time zone and deceleration.

10. The seatbelt apparatus for the vehicle of claim 2, wherein the  
5 correcting unit corrects the detected value of the deceleration detecting sensor by an expression of:

$$X^- = X + X' + \Delta t$$

where  $X$  represents the detected value of the deceleration detecting sensor,  $X'$  a differential value of the detected value  $X$ ,  $X^-$  a corrected value  
10 of deceleration and  $\Delta t$  represents a time for anticipation.

11. A seatbelt apparatus for a vehicle, comprising:

a webbing for restraining a passenger seated on a seat;

a retractor for winding and rewinding the webbing;

15 a first pretensioner that allows the retractor to wind the webbing thereinto or rewind the webbing therefrom;

a second pretensioner that applies a tension to the webbing in an emergency for the vehicle, thereby restraining the passenger through the webbing;

20 deceleration detecting means for detecting a decelerating state of the vehicle; and

controlling means for controlling the operations of the first pretensioner and the second pretensioner corresponding to a detected value from the deceleration detecting means,

25 wherein the controlling means includes correcting means for correcting the detected value of the deceleration detecting means in

anticipation of the future so as to advance a timing of the first pretensioner to wind the webbing.

12. A method of controlling a seatbelt for a vehicle, comprising:

5 detecting a decelerating state of the vehicle by a deceleration detecting sensor;

correcting a detected value from the deceleration detecting sensor so as to be larger than an actual deceleration of the vehicle or a value in correlation with the actual deceleration; and

10 advancing a timing for a pretensioner to wind a webbing of the seatbelt, based on a correction value obtained by correcting the detected value.

13. The method of controlling the seatbelt for the vehicle of claim 12,

15 wherein the detected value of the deceleration detecting sensor is corrected by an expression of:

$$X^- = X + X' \times \Delta t$$

20 where X represents the detected value of the deceleration detecting sensor, X' a differential value of the detected value X, X<sup>-</sup> a corrected value of deceleration and  $\Delta t$  represents a time for anticipation.